APR 29 1991

651-B-5

I 29. 79/5:C 15/2

environmental assessment
and addendums

electrical distribution system replacement and cascade dam removal

ORIGINAL
COMPLETED

YOSEMITE

NATIONAL PARK / CALIFORNIA

Hqw

ENVIRONMENTAL ASSESSMENT AND ADDENDUMS
ELECTRICAL DISTRIBUTION SYSTEM REPLACEMENT AND CASCADE DAM REMOVAL

YOSEMITE NATIONAL PARK
California

July 1987

U.S. Department of the Interior / National Park Service

A

CONTENTS

PURPOSE OF AND NEED OF ACTION 2
Background 2
Problem Statement 2
Purpose 3

AFFECTED ENVIRONMENT 4
Existing Conditions 4
Natural Resources 5
Cultural Resources 7
Socioeconomic Conditions 8

ALTERNATIVES AND MITIGATING MEASURES 9
Mitigating Measures 9
Alternatives 10
Electrical Distribution System 10
Alternative 1 10
Alternative 2 10
Cascade Dam Removal 11
Alternative A 11
Alternative B 11
Alternative C 11
Alternative D 11

ENVIRONMENTAL CONSEQUENCES 11

APPENDIX 17

ADDENDUM I 18

ADDENDUM II 20
Summary of Impacts 21

REFERENCES 22

PREPARERS 24

PURPOSE OF AND NEED FOR ACTION

BACKGROUND

In 1982 the National Park Service prepared an Environmental Assessment/Hydroelectric Power System, to evaluate the possible alternatives to either continue or discontinue the utilization of the hydroelectric system on the Merced River in Yosemite National Park. Six alternatives were evaluated to compare and contrast the environmental and historical consequences of each proposal. The alternatives included: no action, abandon the system, repair the system, slightly increase the capacity of the system, substantially increase the capacity of the system, and significantly increase the capacity of the system. The six alternatives were formulated in consideration of engineering feasibility, environmental impact, cultural resource impact, visitor impact, visitor safety, economic feasibility, and consistency with policy.

In 1986, following extensive environmental and cultural resource evaluations, including a formal instream flow study of the Merced River (USFWS, 1985), the National Park Service determined to abandon the system. Although that decision meant that Yosemite National Park would purchase its entire electrical power supply from the Pacific Gas and Electric Company, the decision was made because it would lead to the fewest actual and potential long-term environmental consequences, and would allow approximately two acres of mixed conifer habitat and 1-1/2 mile stretch of the Merced River to return to natural conditions, and not place the park service in the position of selling its resources.

In May 1986, a Finding of No Significant Impact was released, formally announcing the decision to abandon the system; and the National Park Service concurrently entered into a Memorandum of Agreement with the California State Historic Preservation Officer and the Advisory Council on Historic Preservation for appropriate mitigation of the adverse effect of removing the hydroelectric system (which was listed on the National Register of Historic Places).

In addition, a Categorical Exclusion was approved in December 1985, for the installation of underground primary electrical lines from the abandoned powerhouse to Substation #1 in Yosemite Valley. This portion of the project was completed in 1986.

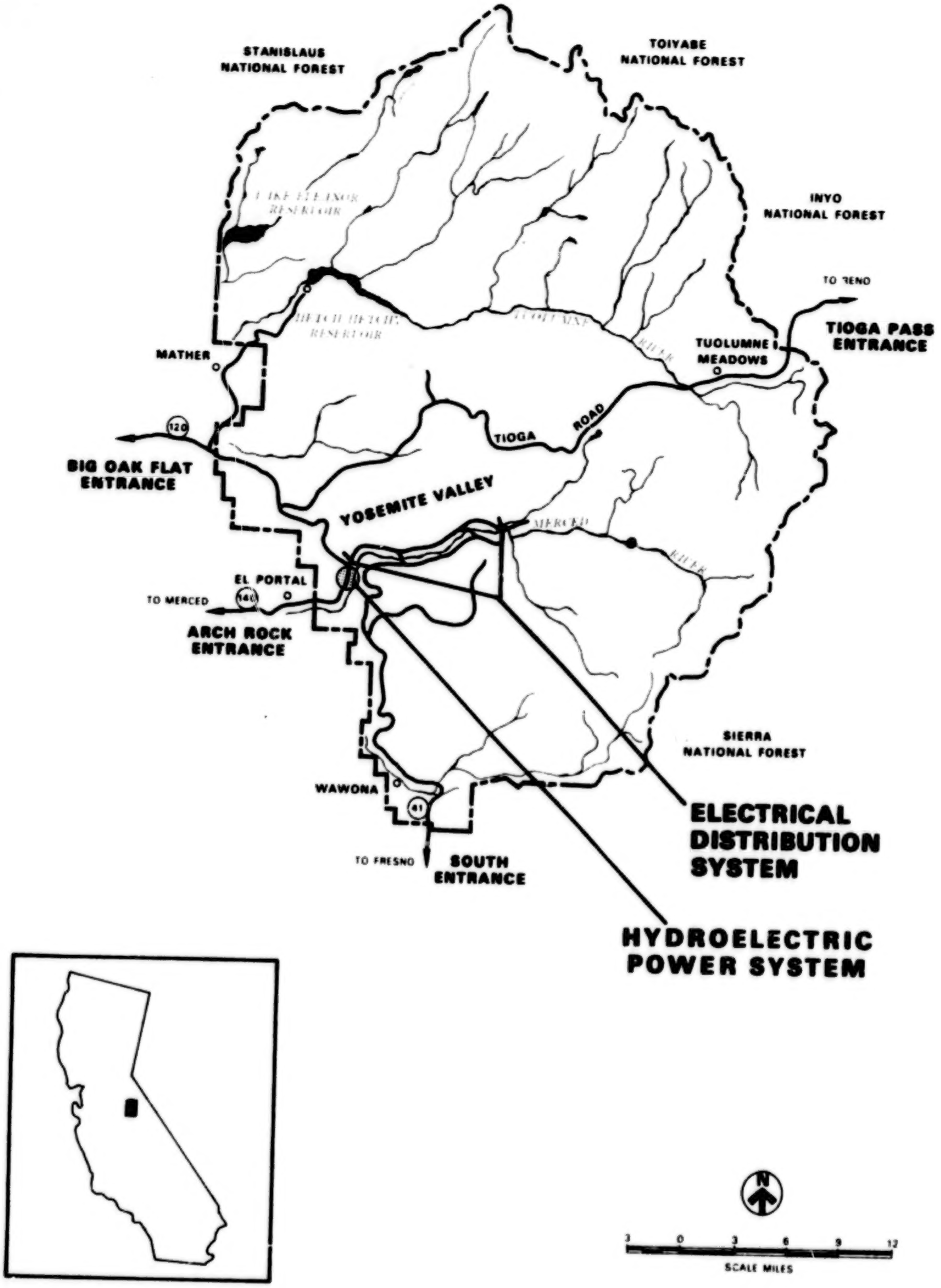
PROBLEM STATEMENT

The National Park Service is now in the process of preliminary design, leading towards the completion of the rehabilitation of the entire Yosemite Valley electrical distribution system. This proposed project will include the completion of new underground primary electrical cables to the Valley, new underground secondary distribution throughout the Valley, and the associated construction of substations, switching stations, and meters. It is designed to alleviate a variety of long-standing operation, maintenance, and life-safety concerns, and to serve the park, the concessioner, and the visiting public well into the twenty-first century. The present Yosemite Valley electrical system, parts of which more than sixty-five years old, has been described by a private consulting firm as "reaching a state of deterioration and obsolescence which results in inefficient and potentially hazardous operation."

As part of this project, the National Park Service is also considering alternatives for the removal of the abandoned Cascade Dam, which will no longer be used to direct water into the hydroelectric plant, and for the rehabilitation of the Merced River corridor to its natural state.

PURPOSE

This environmental assessment will consider alternatives for the completion of the electrical distribution system in Yosemite Valley, in order to ensure that the proposed project is designed to avoid or mitigate all possible environmental impacts associated with the project. The assessment will also consider alternative proposals for the removal of the abandoned Cascade Dam, and the restoration of the dam site to natural conditions, in order to ensure the avoidance or mitigation of potential environmental impacts, and to identify appropriate measures for the improvement of the river corridor and its associated fisheries and riparian habitats (See Addendum).



PROJECT AREA
YOSEMITE NATIONAL PARK
CALIFORNIA
UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

104 | 40168
DSC | NOV 86

AFFECTED ENVIRONMENT

EXISTING CONDITIONS

The Yosemite National Park hydroelectric power plant is within the park boundaries on the Merced River near the junction of Big Oak Flat Road and El Portal Road. This site is less than 1 mile west of the lower end of Yosemite Valley, the destination of most park visitors; facilities encompass a 30-acre section of the northern half of the Merced River drainage channel, which runs west to southwest. Elevations of the facilities range from a maximum of 3,817 feet at the diversion dam to a minimum of approximately 3,500 feet at the Yosemite power station within the Valley.

The status and current condition of the project elements are as follows:

Diversion Dam

The diversion dam, the first component of the hydroelectric power system to be constructed, was completed in early 1917. This timber crib dam is 170 feet long and spans the Merced River at the intersection of El Portal Road and Big Oak Flat Road. Anchored by sheet piles to a substratum of gravel some 18 feet below the water and sand of the river, the dam is built of "cribs" formed by logs or square timbers spiked together. These cribs are filled with boulders and rocks and then sheathed with butt-edged, rough-hewn redwood boards.

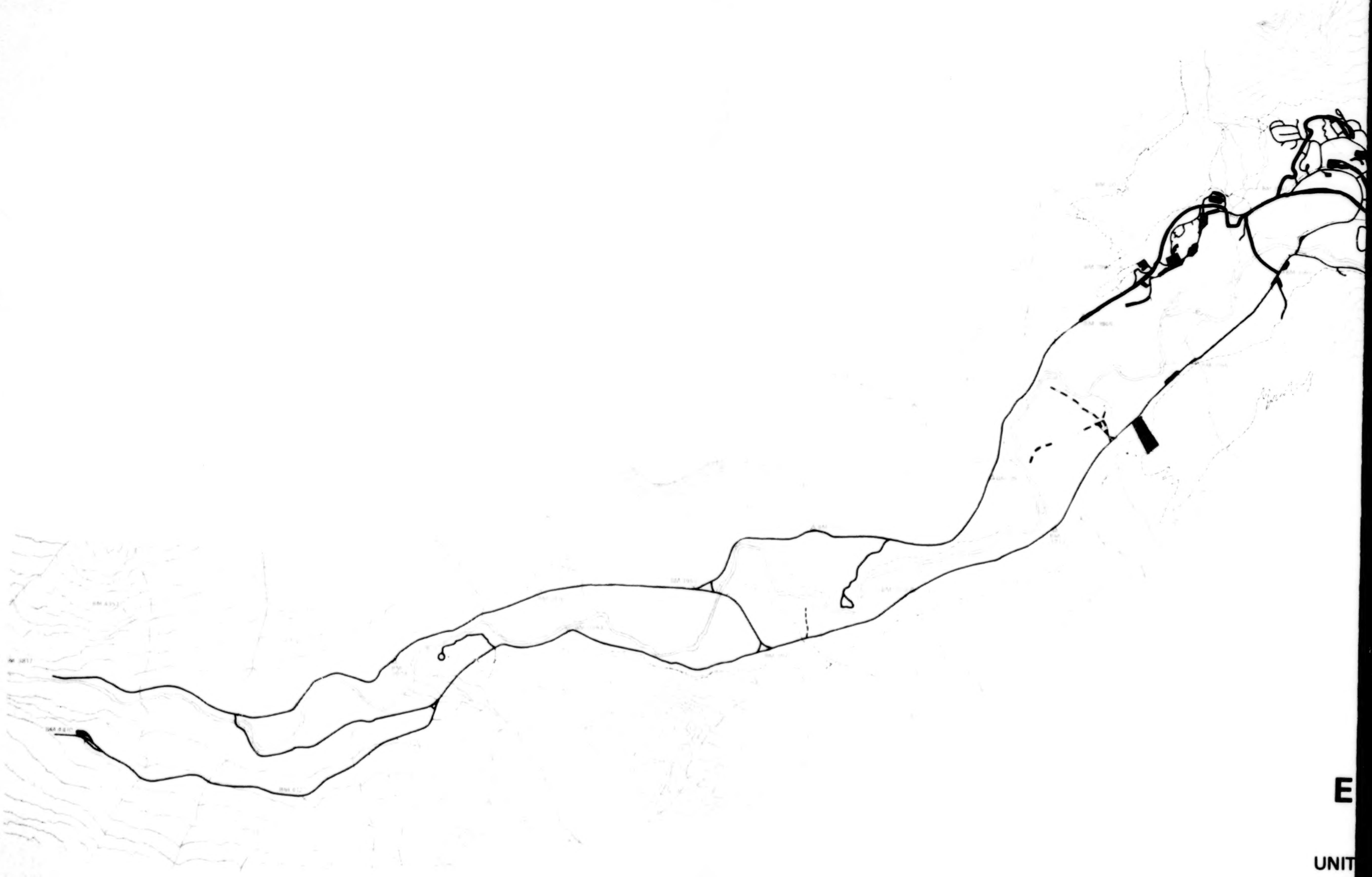
The dam is flanked by two concrete abutments, both about 30 feet high. The crest height of the dam is 17 feet 4 inches, and it impounds less than 1 acre of water. Much of this water gently flows over the flat crest and then down the slope, running over a concrete sill and an area of consolidated stone and concrete before reentering the riverbed. A narrow spillway or gate to the south of the dam's center allows a slightly larger volume of water to escape, forming the main flow of the resumed course of the river.

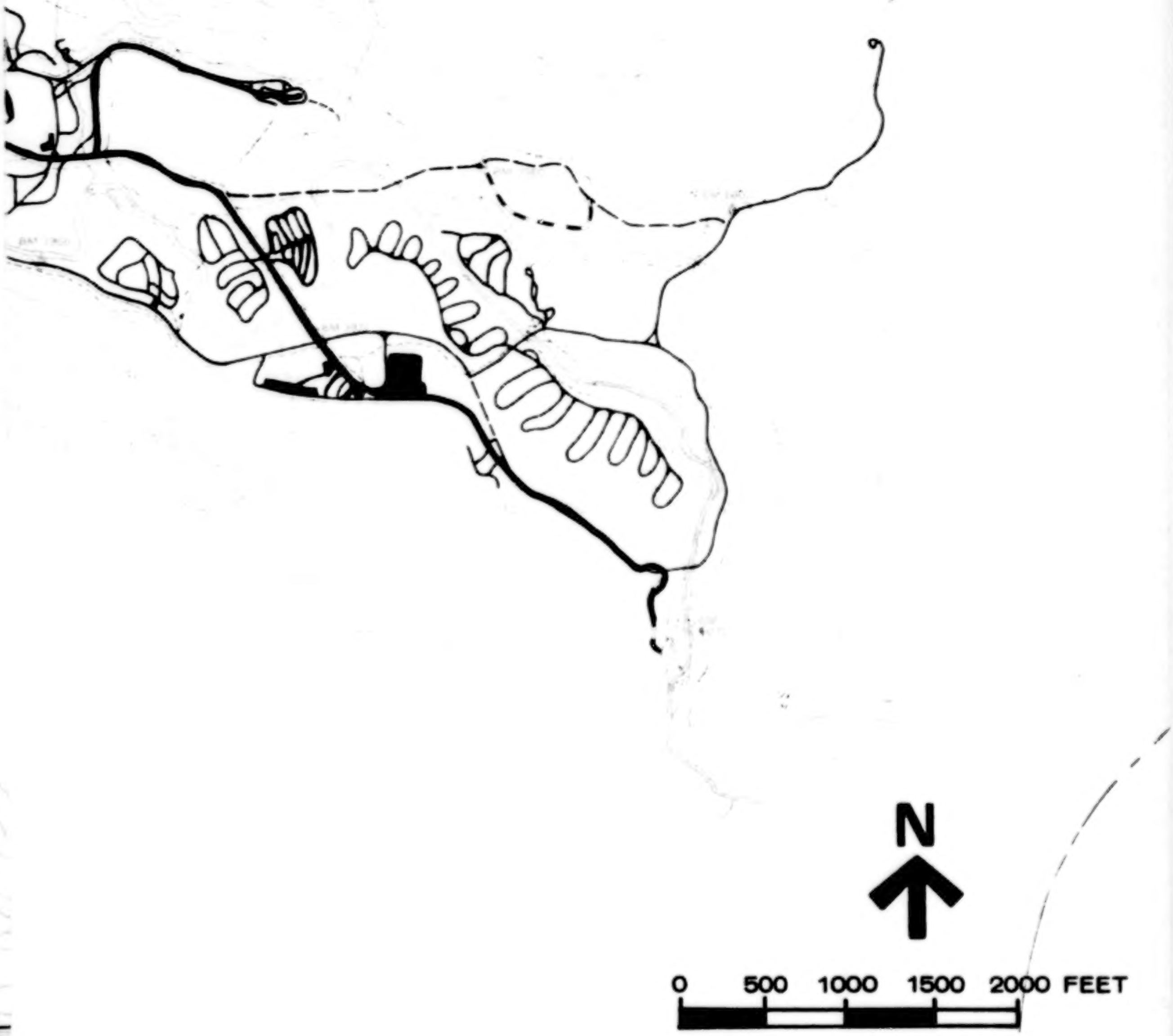
The dam has undergone no major modifications since it was built. However, rot and occasional flood damage have necessitated repairs and partial replacements. The most notable repairs took place in 1951, when the wooden facing of the dam was renewed with rough redwood timbers. Rotten facing boards have been replaced periodically. The dam is in good condition.

Distribution System to the Valley and Wawona Tunnel

The existing distribution system is substandard and at an electrical capacity differing from the Pacific Gas and Electric's (P, G & E) transmission lines. Engineering studies have determined that the system is in need of upgrading and replacement. There are over eight miles of primary and secondary electrical lines and approximately one-third of these lines are in good condition. The remaining two-thirds is in an advanced state of deterioration. The majority of the distribution system is more than 65 years old and it is obsolete which results in inefficient and potentially hazardous

BEST COPY AVAILABLE





LECTRICAL DISTRIBUTION SYSTEM

YOSEMITE NATIONAL PARK

ED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE

104	40169
DSC	NOV 86

6A

operation. Several polychlorinated biphenol (PCB) contaminated transformers are still functional along the route and these must be replaced. This system could fail at any time which poses potential health and safety hazards.

The electrical feeder line to Wawona Tunnel is also of the same age and in the same state of deterioration. This aerial line supplies power from the powerhouse to the lighting system within the tunnel.

NATURAL RESOURCES

Detailed information of Yosemite natural resources is found in the 1978 Yosemite Draft Environment Statement, General Management Plan. Only that material related to alternative actions on the Cascade Dam and electrical distribution system are repeated in this section.

Climate

The area receives an average of 37 inches of annual precipitation, one-third of which is snow. An average of only 5 percent of the precipitation occurs between June and September. The average daily temperature range in Yosemite Valley during July is from 50 to 90 degrees Fahrenheit and during January is 23 to 45 degrees Fahrenheit. Winter construction work is possible in most years.

The Cascade Dam and valley areas generally do not receive sufficient quantities of snow to present an avalanche hazard.

Air Quality

The acreage encompassed by the power distribution facilities is in the Mountain Counties Air Basin, the same as Yosemite National Park (designated by California Air Resources Board in 1980). The area is designated class 1 and is regulated by the guidelines outlined in the Clean Air Act (Public Law 88206, 1963; amended by Public Law 95-95, 1977). The class 1 category indicates that minimal air quality degradation is acceptable in this air basin.

Vegetation

In the immediate vicinity of the diversion dam the dominant vegetation is riparian. The major plant species include willow, big-leaf maple, black oak, alder, canyon live oak, poplar, ponderosa pine, incense cedar, and white fir. There is also a small (approximately 50 square feet) marsh area composed of grasses and sedges on the south side of the river just upstream from the dam.

From the powerhouse to the valley the electrical distribution line is located in a conduit along the existing effluent line beneath the roadway. At the end point of this section the upgraded feeder line would follow a path under the existing roadway which passes through a variety of vegetation communities. These include meadows, oak woodlands, ponderosa forest, oak/ponderosa and oak/Douglas fir.

There are no known listed threatened or endangered plant species or candidate plant species located in the vicinity of the hydroelectric dam portion of the project (U.S. Department of Interior, Fish and Wildlife Service 1980b; see memorandum in appendix from acting superintendent, Yosemite National Park).

Fish and Wildlife

The forested areas on and around the sites have mule deer, ground squirrels, gray squirrels, spotted skunks, gray fox, bobcat, mountain lion, coyote, shrews, and moles. The birds in the area include band-tailed pigeon, pygmy owl, Stellers jay, canyon wren, brown towhee, and ouzel. The reptiles and amphibians include rubber boa, mountain king snake, and red-legged frog. The main aquatic wildlife include rainbow trout, Sacramento sucker, and various arthropods.

No known threatened or endangered terrestrial fauna (as listed by the Fish and Wildlife Service in "Republication of Lists of Endangered and Threatened Species and Correction of Technical Errors in Final Rules," Federal Register, May 20, 1980 and 50 CFR 17.11 and 17.12, 1986) permanently inhabit or breed on the acreage in the vicinity of th power facilities. Along the pathway which was installed in a conduit beneath the existing roadway a pair of peregrine falcons (Falco peregrines anatum) nest near the site. In order not to disturb these activities the construction near the site did not take place from February through May.

Geology/Topography

The acreage encompassed by the power facilities is a small portion of the Merced River canyon. The site is a characteristic U-shaped canyon due to glacial advances and retreats, followed by weathering. Boulders and rocks of various sizes have been deposited by past glacial activity. Geologic hazards include the potential for rockfall.

The slopes of the area are quite variable. The intake works area is nearly level. The distribution line follows a path along a slight to very slight gradient through the U-shaped valley.

Soils

Most of the soils on the acreage are from metasedimentary and granitic rocks. Alluvial boulders, cobbles, and loamy sands are found in the drainage.

The residual soils on the slopes have an average depth of from 2 to 4 feet. The soils are moderately acidic because of the conifer vegetation of the area.

The topography of the immediate location is the most important factor contributing to soil differentiation, because its influence on surface runoff and groundwater results in a variable distribution of stony soils and extensive separation of variously aged alluvial deposits. Along the distribution line's pathway the underlying soils are generally loamy sands formed on moraines or in colluvium deposits. These soils are intermixed with varying types and quantities of pebbles, cobbles, and boulders.

Hydrology

Surface Water. The project acreage is within the San Joaquin River basin. The Merced River flows along the southern edge of the project area. The drainage basin includes 321 square miles above Pohono Bridge and 9 square miles between Pohono and the diversion dam. Major contributing creeks include Tenaya, Yosemite, and Bridalveil. There are also several springs and many ephemeral drainage areas that flow into the Merced River (Hydro-Triad and Protrans Consultants 1981).

The average annual discharge of the Merced River at Pohono Bridge is 435,400 acre-feet (U.S. Department of the Interior, National Park Service 1978). Flows at the diversion dam are reported to be 10 percent greater than those recorded at Pohono; the increase in flow volume is attributed to spring and underground drainage (U.S. Department of the Interior, National Park Service 1979).

Most of the annual precipitation in the drainage areas falls as snow in the winter, creating a peak spring runoff pattern typical of high altitude Sierran streams. The U.S. Geological Survey operates a stream gauge at the Pohono Bridge. Daily flow records have been recorded at this station for the past 64 years. The wettest month was May 1969, with an average monthly discharge of 5,305 cfs. The wettest year was 1968-1969, with an average annual discharge of 1,219 cfs (Hydro-Triad and Protrans Consultants 1981). The minimum monthly average discharge was 7.38 cfs in September 1977 (U.S. Department of the Interior, Geological Survey 1972-1977), and a maximum average daily discharge was recorded at 18,000 cfs on December 23, 1955 (U.S. Department of the Interior, Geological Survey, Jorgensen et al. 1968).

Floodplain. The floodplain has not been mapped in the generating facilities area, but the water intake station, power plant, and the dam are clearly within the floodplain. Also, the distribution line follows a path both inside and outside of the mapped floodplain in and near the valley.

CULTURAL RESOURCES

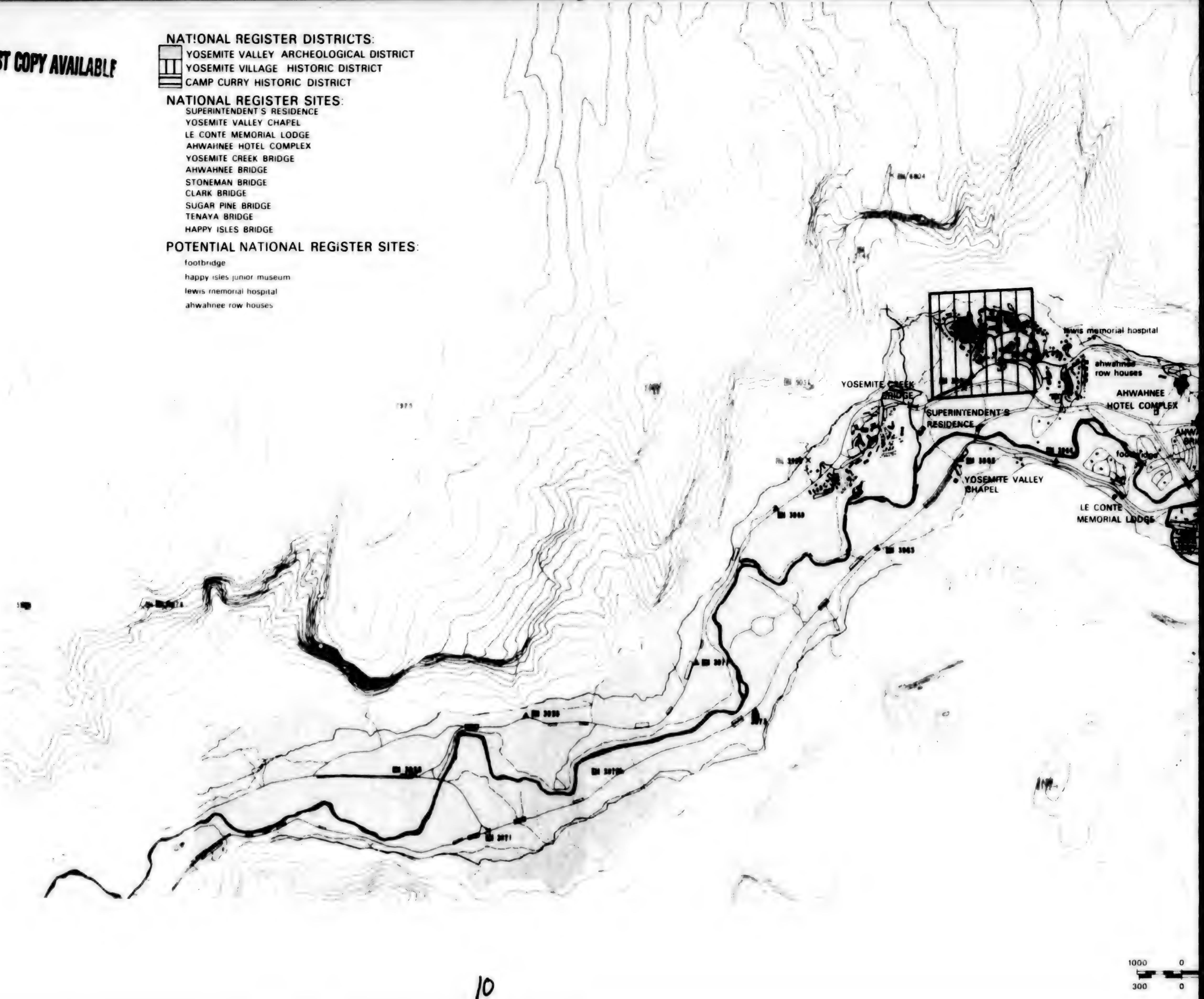
Archeological Resources

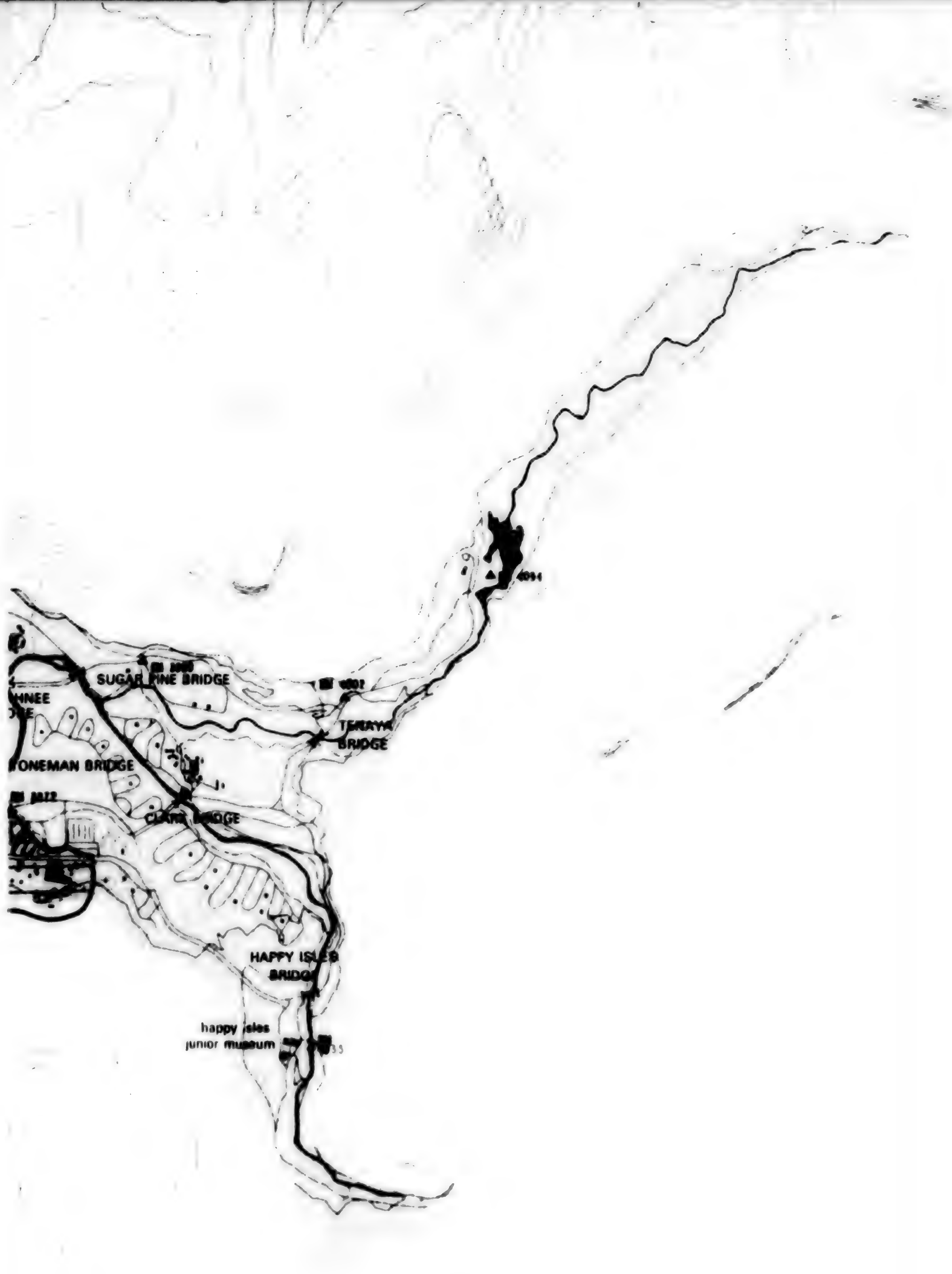
Yosemite Valley is extremely rich in archeological resources, and the Yosemite Valley Archeological District was entered on the National Register of Historic Places in 1978. This district, which encompasses approximately 8100 acres of the valley floor, is generally bounded by the Wawona Tunnel on the west, the eastern shore of Mirror Lake and the gauging station of

BLANK

PAGE

BEST COPY AVAILABLE





YOSEMITE VALLEY CULTURAL RESOURCES

YOSEMITE NATIONAL PARK

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

10A

104 | 40154
DSC | JUNE 83

Illilouette Creek on the east, and the cliff edges which rise out of the valley of the north and south. The great majority of the developed area of Yosemite Valley, including most of the area of the proposed electrical project, is within the boundaries of the archeological district.

There are no known archeological resources in the vicinity of the Cascade Dam, but there are a considerable number of sites in the vicinity of the distribution lines, but they are being avoided where possible and mitigated where not. The SHPO has been actively involved in determining appropriate mitigating measures. Extensive "project specific" archeological investigation has been conducted for this project.

Historic Resources

Yosemite Valley is also rich in historic resources. The valley contains two National Register districts, and four other National Register complexes and structures. These districts and complexes include 98 historic structures and five historic sites, the majority of which are within the proposed project area.

The Cascade Dam, as a major component of the Yosemite hydroelectric system, is also listed on the National Register of Historic Places.

SOCIOECONOMIC CONDITIONS

Yosemite is located on the eastern side of central California, about a half-day drive from both San Francisco and Los Angeles. The hydroelectric power system is in Mariposa County, one of the three counties in which Yosemite lies. The system is located about 12 miles east of Yosemite's administrative site at El Portal, 7 miles east of the Arch Rock entrance station, and 6 miles west of Yosemite Village. On an average the Park Service produced approximately two-thirds of the power needed in Yosemite Valley, and the remainder was purchased from PG&E. A little over 10 percent of the power generated by Yosemite was sold to PG&E as surplus power.

Future Demand for Electricity

The 1980 General Management Plan for Yosemite calls for a slight reduction in use in Yosemite Valley. A decrease in the number of campsites and some overnight lodging will reduce power demands slightly in the valley. Moving the headquarters and many of the employee residences from the Valley to El Portal is the major reduction of employee use in the Valley. The move of some employees out of the Valley is not anticipated to significantly reduce electrical consumption since other employees, who currently live in tent cabins with little or no utilities, will probably move into more standard housing, thereby increasing their use of electricity and compensating for the removal of some employees from the Valley. So, no significant change in the consumption of electricity is expected.

11

A substantial increase in electrical demand could be realized if the Valley shuttle bus system was converted from fuel-powered to electrically powered buses.

Visitor Use

Over 2.5 million people visit Yosemite each year, and the vast majority visit Yosemite Valley. About 25 percent of the visitors travel California 140 to enter the park and thus pass by the powerhouse and dam. People who enter the park at the Big Oak Flat entrance or the Tioga Pass entrance and travel to the Valley (about 30-35 percent of the visitors) also pass by the dam. Most visitor use occurs between April and October. Frequently people get out of their cars at the dam to take pictures or to fish. While the pool behind the dam is surrounded by deciduous trees and is a scenic spot, the reason most people stop is probably because of the large parking space across from the dam.

ALTERNATIVES AND MITIGATING MEASURES

Mitigating Measures

1. The electrical distribution lines will be buried beneath roadways and pathways whenever possible.

2. The distribution line segments which deviate from the impacted roadways and pathways will be surveyed for presence of endangered or threatened species and cultural resources prior to installation. During the public review period a formal consult will be requested of the U.S. Fish and Wildlife Service concerning such species.

3. Along the 1000 linear foot cross-country path of the distribution line topsoil will be removed and stockpiled for replacement following installation. At that point the soil surface will be mulched over with a mix of finely chipped oak and oak leaves to protect the soil surface. The area would then be allowed to revegetate naturally. This process will be supplemented by "broadcast spreading" of locally collected grass seed and plantings of black oaks outside the drip line of existing oaks.

4. The section noted above (3) along with any other section that deviates from pathways will be surveyed for presence of cultural resources and endangered or threatened plants and if such resources are found measures to avoid or mitigate impact will be implemented.

5. The park resource staff must approve the final route of the distribution line during the preliminary design of the project.

6. Removal of the Cascade Dam will take place during low water flows within the Merced River. (August, September and October) The method of sediment removal behind the dam along with the dam removal will conform to the Clean Water Act and with state and local regulations concerning sediment releases.

7. The south concrete abutment would be demolished and the intake structures would be demolished also, but the bank wall would remain in place for erosion control.

8. The recommended dam removal alternative must be approved by the U.S. Fish and Wildlife Service prior to demolition.

9. Revegetation along the Merced River banks near the dam will use native riparian plants. The north bank upstream from the dam site would be armored with boulders encountered within the sediment or from the timber-crib fill.

10. The determination on where to dispose of the sediments removed from behind the Cascade Dam will be evaluated in the separate Cascade Dam environmental assessment (See Addendum).

Alternatives

The alternatives in this section are separated according to the objectives of the complete project. Concerning the installation of the new electrical distribution only two options are considered; the "No Action" and the replacement and upgrading of the system. Concerning the removal of the Cascade Dam several options for dam removal in combination with sediment removal are considered. The wood-stave pipeline would also be removed and this portion of the project was outlined in the 1982 Environmental Assessment on the hydroelectric power system. This portion of the project will not be repeated in this analysis except to evaluate the possibility of the penstock removal by helicopter.

Electrical Distribution System

ALTERNATIVE 1--No Action. Only those repairs required to keep the electrical distribution system in operation would be made. The system would remain substandard, potentially hazardous, and excessive power losses would continue.

ALTERNATIVE 2--(Preferred). Replace and upgrade the electrical distribution system within the Valley. This alternative proposes the complete replacement of the substandard, inefficient and potentially hazardous electrical distribution system in the valley and to Wawona Tunnel. The eight miles of primary and secondary lines would be buried beneath roads and trails (for the most part). The upgraded system would have an ultimate design load of 8000 KVA; the system would be designed to comply with PG&E's design criteria and; the system would be designed in accordance with applicable codes - including the National Electrical Code and the National Electrical Safety Code. The camp 6 area currently used as a "staging" area will also be used for that purpose under this contract.

Cascade Dam Removal (See Addendum)

The removal of the dam structures below the streambed level was rejected as being excessive because the potential effects on the environment and the lateral support of the roadway could be adversely effected. The existing wood-stave penstock would be removed under all alternatives to eliminate this potential safety hazard.

Alternative A--No Action. Implementation of this alternative would result in leaving the dam in place to deteriorate through time.

Alternative B (Preferred)--Sediment Removal Followed by Dam Removal. This alternative is essentially what has been recommended by the U.S. Fish and Wildlife Service, 1986. First a sandbag coffer dam would be installed to divert river flows. Second, the sediments in the channel leading to the bypass works of the structure will be excavated. The flows in the river would then be diverted to that channel which leads through the bypass works. Third, as much sediment which has been built up behind dam will be removed as is feasible. Fourth, the dam structures will be removed to the original streambed level. The coffer dam would be removed and the excavated diversion channel will be filled in with cobbles and boulders from the dam removal. And, finally, the intake structure would be removed and the disturbed bank area would be revegetated using native riparian plant species. Please note that the wood-stave penstock will also be removed, but this portion of the project was previously assessed in the 1982 Hydroelectric Power System Environmental Assessment and the evaluation is not repeated in this document except to evaluate the possibility of its removal by helicopter.

Alternative C--Dam Removal Only. This alternative would require the removal of the dam, but the sediment behind the structure would be allowed to disperse through natural erosion processes. The same coffer dam and diversion channel noted in "Alternative B" is also required in this alternative.

Alternative D--Phased Dam Removal without Removing Sediment. This alternative proposes the phased removal of the dam over several years to allow incremental sediment discharge from natural erosion behind the structure. The diversion channel and sandbag barrier (coffer dam) would also be required in this alternative.

ENVIRONMENTAL CONSEQUENCES

ELECTRICAL DISTRIBUTION SYSTEM

ALTERNATIVE 1--"No Action." There will be no environmental or cultural resource impacts as a result of implementing this alternative. However, the distribution system will remain substandard and electricity losses will continue to be excessive. The transformers contaminated with PCB's would still require replacement as these chemicals do pose potential public health problems if they come into contact with people. Although these compounds have not been conclusively identified as cancer causing compounds in humans they have been identified as carcinogens in lab animals. This information supplies sufficient concern to implicate PCB's as a potential health hazard which must be removed from the environment.

The electrical system would eventually fail and, depending where and when the failure occurred, could cause serious public safety problems.

ALTERNATIVE 2--(Preferred). "Replace and upgrade the electrical distribution system within the Valley."

NATURAL RESOURCES

Because of the electrical distribution system's proposed route would follow a route along existing roadways and pathways, only slight additional environmental impacts would occur by burying the electrical line beneath these impacted areas.

There is an approximately 1,000 linear foot length of primary distribution line which would follow a path cross-country through oak woodland. This deviation from established pathways is due to the presence of a significant archeological site which must be avoided. The line would be buried beneath the soil surface resulting in the disturbance of approximately 0.2 acre of grassland within the oak woodland. Although oak trees will be avoided some root pruning is expected, but the extent of pruning will be less than 10 percent of any one tree's root system so tree loss is not expected. A trees response to root pruning is usually reduced tree vigor and growth which persists until the tree readjusts to the altered state. The extent of root pruning along with its location determines the effect on the tree. Also of concern when a tree's roots are pruned is the entrance of pathogenic organisms into the tree's physiology. This hazard is impossible to predict as it depends on the extent of root pruning, the timing of the action and the presence of the disease organism.

The disturbed soils would be treated as outlined in the mitigating measures section (15;3). There would be a very slight, but temporary decrease in air quality due to the emissions of construction equipment and the dust from soil disturbance.

There are also numerous deviations of short length within the developed area of the valley. The installation of these secondary feeder lines would result in the disturbance of an additional 0.1 acre of surface area and it would also result in some root pruning as noted above.

All transformers contaminated with PCB's will be replaced with oil insulated types to eliminate this potential public safety hazard. The PCB disposal will be done according to an EPA approved method.

The replacement of the overhead line to Wawona Tunnel is not expected to result in environmental impacts. Because it will be placed overhead along its existing route, replacing this line would require some pruning of tree limbs, but no adverse impact is expected.

Use of Camp 6 site as a staging area would result in very limited environmental impacts due to the existing impacted state of the proposed site. However, the approximate 0.2 acre proposed site would be screened with a wooden-slatted fence to decrease the visual intrusion of a construction headquarters.

ARCHEOLOGICAL RESOURCES

Although this project will take place within the Yosemite Valley Archeological District, it is not expected to have an impact upon any of the 98 individual archeological sites within the district, as all attempts are being made during preliminary design to avoid such sites. Archeological surveys and testing, to determine the size, depth, density and relative significance of individual sites in the vicinity of proposed construction activities has been conducted during the 1985 and 1986 field seasons. Further testing is scheduled for 1987. The archeological crews will continue to work closely with the preliminary design team to seek all prudent and feasible design solutions to avoid impacts upon any significant archeological sites. A formal archeological clearance will be obtained prior to any construction activities. Should there be any archeological sites which cannot be avoided by construction, all appropriate measures will be taken to satisfactorily mitigate any impact upon these sites. Should there be any archeological sites which cannot be avoided by construction, all appropriate measures will be taken to satisfactorily mitigate any impact upon these sites. Since the Yosemite Valley Archeological District is listed on the National Register of Historic Places, the National Park Service will complete all cultural resource compliance procedures in consultation with the California State Historic Preservation Office, in accordance with the 1979 Memorandum of Agreement for the Yosemite General Management Plan.

Historic Resources

Although this project will take place within the boundaries of the Yosemite Village Historic District and the Camp Curry Historic District, as well as in the vicinity of the Ahwahnee Hotel Complex, the Le Conte Memorial Lodge, the Yosemite Valley Chapel, and the Yosemite Valley bridges, it will have no impact upon those sites and districts. The preferred alternative will have no impact to the significant and contributing characteristics of those sites and districts which made them eligible for listing on the National Register of Historic Places. Since the project will, however, take place within the vicinity of these National Register properties, all appropriate cultural resource compliance procedures will be carried out prior to construction.

Cascade Dam (See Addendum)

Although the dam removal portion of this project has been deferred pending additional environmental information the potentially hazardous penstock will be removed. The impacts of removing the penstock were evaluated on the basis of a "worst case" analysis in the 1982 environmental assessment on the hydroelectric power system. However, the use of a helicopter to transport demolitioned penstock material was not assessed as it was deemed economically infeasible. At this time the precise method of penstock material removal has not been established, but the possibility of helicopter transport has resurfaced. This technique is one available method which would lead to the least surface area disturbances to remove the demolished penstock material. It is estimated that approximately five days of helicopter flight time would be required to complete the material removal. During this time period the noise levels in the area would increase substantially. Also, golden eagles which are known to periodically occupy the area would be temporarily displaced. This action will take place during the late summer/early fall to avoid disturbing the nesting activities of the species.

Alternative A--No Action.

Natural Resources

There would be no immediate environmental effects as a result of this action, but the dam will fail in time. It is likely that the dam will fail during the high runoff period (March, April, May and June) which corresponds to the egg incubation and fry stages of salmonids in the river. These two stages are the most sensitive to environmental disturbances in particular increased silt and sediment loads within the river (USDI, FWS, 1986). If a dam failure occurred during the most sensitive life stages of the trout, maximum quantities of silt and sediment would be released into the river below the dam. It is difficult to predict the level of suspended solids which would be released through time in the river, but should the dam fail during the most sensitive trout periods maximum impact on the fisheries will occur. The sediment releases would depend on the type and extent of the dam break and the subsequent release of sediments is unpredictable as there are too many independent variables.

Cultural Resources

This alternative would have no impact upon cultural resources.

Alternative B (Preferred)--Sediment Removal Followed by Dam Removal.

Natural Resources

This alternative calls for the removal of as much sediments behind the dam as is feasible prior to dam removal. Kennedy, et. al., 1986, estimated the total volume of material behind the dam to be 5700 cubic yards. However, the percentages of silt, sand, cobbles, and boulders were not reported. The intention is to remove as much silt and sand as possible and leave the cobbles and boulders in place or use the material for bank stabilization. This action would substantially reduce the amount of sediments which would be released to the river and potentially impact the fisheries as a result of dam removal. Still high suspended sediment and turbidity levels can be harmful to fish and other aquatic life. However, there are no universal accepted lethal level standards for salmonids. This is due to the fact that there are various types of suspended sediments and it is difficult to measure the reaction of fish to various suspended sediment or turbidity levels under field conditions. There are no standards of allowable levels which indicate physical impairment or behavioral response. (USDI, FWS, 1986) Therefore, the sediment removal would be an attempt to minimize the potential impact on the fisheries. The concrete pipe which leads from the diversion works under El Portal Road to the penstock would be plugged and left in place. The sediments would be removed from the area and used for winter road sanding, disposed of outside the park, or salvaged for future use.

The excavation of sediments from the diversion channel to the bypass works would slightly, but temporarily increase silt and sediment loads downstream, but this procedure is required to minimize the impact of removal. The timber crib diversion dam would be dismantled and the materials would be removed from the park and disposed of. The dam removal would result in the altering of the disturbed riparian vegetation to a more natural state. Fish habitat behind the dam would be decreased slightly, but this loss would be more than compensated for by the gain in habitat downstream from the dam (USDI, FWS,1985). Following complete removal of the water diversion facilities the riparian area will be revegetated with native vegetation as is possible.

Finally the coffer dam constructed of sandbags would be removed and the river would be allowed to retain its natural channel. The diversion channel would be filled with cobbles from the sediment removal or the dam removal activities.

The construction/demolition activities would slightly, but temporarily decrease air quality locally during the construction period.

Under all action alternatives visitors and employees traveling along the Big Oak Flat Road or El Portal Road would occasionally be inconvenienced by traffic delays during construction/demolition.

Cultural Resources

This alternative will have no impact upon archeological resources. Although removal of the Cascade Dam will have an adverse impact upon that portion of the Yosemite hydroelectric system, which is listed on the National Register of Historic Places, the National Park Service has already completed all required cultural resource compliance procedures required for removal of the dam. (See Memorandum of Agreement, Yosemite Hydroelectrical System, May 1986, between the National Park Service, the California State Historic Preservation Officer, and the Advisory Council on Historic Preservation.)

Alternative C--Dam Removal Only. Removing the dam without sediment removal would lead to the greatest potential impact on fisheries. As described in Alternative B the precise impact on the fisheries would occur in this alternative compared to the other action alternatives.

All other impacts in this alternative are the same as described in Alternative B.

Alternative D--Phased Dam Removal without Removing Sediment. Removing the dam in a phased operation without removing the sediment may or may not reduce sediment loads released into the Merced River through time. This is the case because the runoff volume along with the scouring action of the river waters following partial dam removal cannot be predicted. The phased removal operation could result in no sediment released following the initial removal to complete sediment release. It also could result in an incremental sediment release which would be only slightly above the background load. Based on the unpredictability of the water flows and the scouring action which would lead directly to sediment releases the effects on the water quality and fisheries could be at the maximum (Alternative C) or at the minimum (Alternative B). However, phased removal of the sediments would attempt to minimize the affects of large amounts of sediments released into the river.

The installation of the sandbag coffer dam along with excavating sediments from the bypass channel is also included in this alternative and would result in the same impacts as described in Alternative B. All other impacts are the same as described in Alternative B.

Still of major concern is the reliability of follow-up funding after the first phase has been implemented.

BEST COPY AVAILABLE

APPENDIX

United States Department of the Interior
NATIONAL PARK SERVICE
P.O. BOX 577
YOSEMITE NATIONAL PARK, CALIFORNIA 95389

DENVER Service Center
MAR 3 '82

IN REPLY REFER TO:
L7617(DSC-TWE)

Memorandum

To: Assistant Manager, Denver Service Center

From: Acting Superintendent, Yosemite

Subject: Environmental Assessment of Hydroelectric Power System for Yosemite

Our Resources Management staff has surveyed the area to be affected by this project and has determined that no candidate or listed threatened or endangered species will be impacted by the proposed actions.

William N. Burgen
William N. Burgen

ADDENDUM I

PURPOSE

The purpose of this addendum is to identify an inadvertent omission from scope of the electrical distribution system proposals and to present additional information concerning the proposed Cascade Dam removal.

ELECTRICAL DISTRIBUTION SYSTEM OMISSION

In the description of the replacement of the electrical distribution system, the removal of three substations and the construction of a central switching station were not included in the environmental assessment. This switching station is required for a control point and for converting transmitted power to a usable voltage level. The installation of the new switching station would require moving two buildings within the maintenance area.

CASCADE DAM - ADDITIONAL INFORMATION

During the week of April 6 former Yosemite National Park staff members provided information on some construction modifications of the Cascade Dam, which took place during the 1970's. These modifications to the dam structure included the construction of a concrete barrier structure on the upstream dam facing, and a downstream (at the base of the dam) concrete grouted rock support structure to reinforce the dam's integrity.

CONSEQUENCES

ELECTRICAL DISTRIBUTION SYSTEM OMISSION

The proposed switching station structure would be located within the existing heavily impacted maintenance area. This structure would occupy up to 0.1 acre of potential mixed conifer habitat and its installation would require the removal of five incense cedars and three ponderosa pines. The structure would be up to 26 feet in height and it would be designed in an architecturally compatible manner with regard for the surrounding environment.

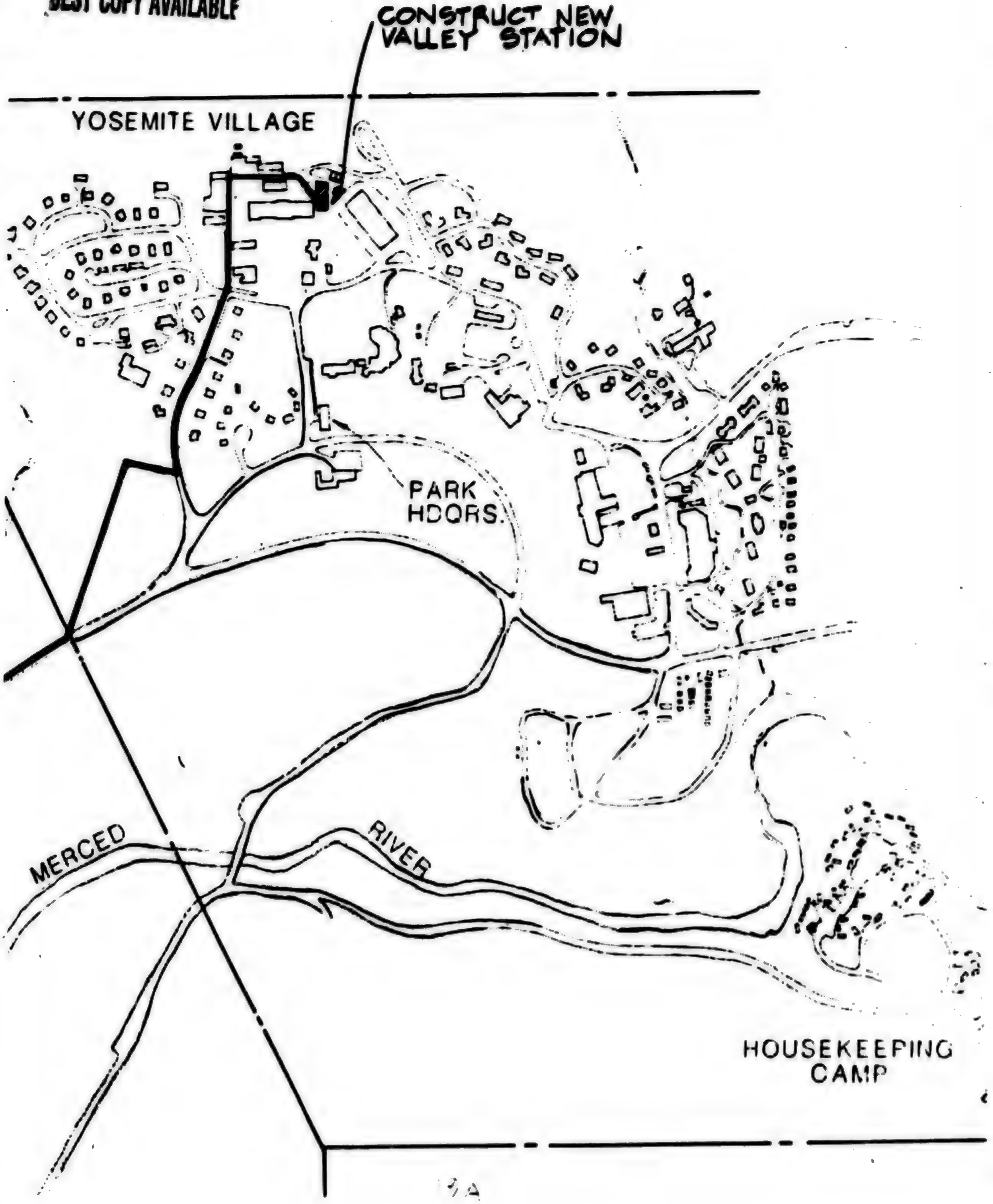
The removal of the three substations would allow 0.03 acre of potential mixed conifer forest to return to a more natural condition.

In summary, a net loss of 0.07 acre of potential mixed conifer forest, including eight mature trees, would be lost through this action.

The two small maintenance buildings would be moved to presently impacted sites outside of the rock fall area.

21

BEST COPY AVAILABLE



The area surrounding the switching station and the substation removal sites will be revegetated using native vegetation. There would be no impact to either archeological or historic resources.

CASCADE DAM - ADDITIONAL INFORMATION

The including of the additional structural components of the dam has compounded the considerations for its removal. In particular the downstream grouted rock may be deemed to be "artificial;" and it may be desirable to remove it to restore the natural state of the river. However, due to unknown effects upon the riverbed and fisheries, the removal of that component may lead to presently unknown environmental impacts.

Based on the additional information concerning the structural modifications to the dam, further environmental analysis is required to make an informed decision on the method and extent of its removal. Consequently, the removal of the dam will not be included in this project. Following further environmental analysis, including hydrological studies and fisheries assessment, a separate document will be prepared on the dam removal.

ADDENDUM II

PURPOSE

The purpose of this addendum is to evaluate the removal of the wood-stave penstock which will be included in this phase of the electrical system rehabilitation.

PENSTOCK

The penstock was used to transport water from the Cascade diversion dam to the power plant. This conduit was constructed between 1916 and 1918. The penstock is in three differing components. These components include a 66-inch diameter concrete section, a 54-inch diameter wood-stave section, and a 42-inch diameter riveted steel section.

The concrete section begins at the intake and extends 343 feet below Highway 140 and surfacing at the north side of the road to connect to the wood-stave portion. The wood-stave portion, constructed with heart of redwood, runs exposed along the contour of the hillside for 5,341 linear feet, crossing 11 trestles (some of which are 30-40 feet high and up to 80 feet long). The steel portion connects to the wood-stave section and extends 600 feet to the power house.

Both the concrete and the steel portions of the penstock are in good condition, but the wood-stave portion is in an extremely advanced state of deterioration. The wood-stave section should be removed immediately due to the potential safety hazard which its mere presence poses.

CONSEQUENCES

The environmental consequences of removing the penstock depends largely upon the selected method of removal. The 1982 environmental assessment on the hydroelectric power system evaluated its removal by high line, by hand through the use of the existing penstock route as the transportation corridor. Still, the use of helicopters to remove the penstock was deleted as being too costly, but it must be considered as a possibility and will be evaluated here.

The penstock will be removed to eliminate the potential safety hazard posed by its presence. Its removal by helicopter will create a noise level that will displace the local wildlife for the approximate five day duration of use. The golden eagles nesting period in early spring will be avoided, but this species will be displaced from the area during the penstock removal activities.

Following penstock removal the route would be recontoured and the area would be allowed to revegetate naturally.

SUMMARY OF IMPACTS

	Alternative 1 No Action	Alternative 2 Replace Electrical System
NATURAL RESOURCES		
AIR QUALITY	No impact	Slight, but temporary local decrease in air quality.
SOILS	No impact	0.3 acre of disturbed soil area.
VEGETATION	No impact	0.1 acre of meadow temporarily (one season) disturbed and 0.1 acre of oak woodland permanently impacted.
WILDLIFE	No impact	Some wildlife temporarily displaced due to construction activities, 0.1 acre of oak woodland habitat lost.
ENDANGERED AND/OR THREATENED SPECIES	No impact	No known impact, survey required along cross-country routes.
FLOODPLAINS/WETLANDS	No impact	No adverse impact.
CULTURAL RESOURCES	No impact	Adverse impact, but mitigated by transferring generators and section of penstock to Fresno Museum.
VISITOR USE	Electrical failure could be hazardous.	Less hazardous, more dependable system.
RELIABILITY OF ELECTRICAL SYSTEM	Unreliable system.	Reliable system.

REFERENCES

CALIFORNIA DEPARTMENT OF FISH AND GAME

1981 Personal communication from Dennis Lee, Associate Fishery Biologist, to John Brooks, Denver Service Center, National Park Service, November 6.

HYDRO-TRIAD, LTD.

1982 "Yosemite Hydroelectric Power Plant Capacity Optimization Study, An Addendum to the Yosemite Hydroelectric Power Plan Rehabilitation Study." Prepared for the National Park Service. On file at the Denver Service Center.

KENNEDY/JENKS/CHILTON CONSULTING ENGINEERS

1986 "Rehabilitation of Electrical System and Power Generation Facility - Phase II, Preliminary Design (Demolition) - 60% Design Report."

1986 "Rehabilitation of Electric System and Power Generation Facility, Phase III, Preliminary Design, 60%." Yosemite National Park

"Memorandum of Agreement: Yosemite National Park Hydroelectrical Generating System," May 1986, by National Park Service, California State Historic Preservation Officer, and Advisory Council on Historic Preservation.

U. S. DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

1980a "Republication of Lists of Endangered and Threatened Species and Correction of Technical Errors in Final Rules." Federal Register 45:99, 242, May 20.

1980b "Review of Plant Taxa for Listing as Endangered or Threatened Species." Federal Register, December 15.

1985 "Merced River, Hydroelectric Powerplant, Instream Flow Study, Yosemite National Park - Draft Final Report." May. Prepared by Gary L. Taylor.

1986 "Endangered and Threatened Wildlife and Plants" 50 CFR 17.11 and 17.12, January 1.

1986 Memorandum: "Merced River Hydroelectric Diversion Dam Removal" from J.D. Carson, Acting Field Supervisor.

U.S. DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY

1968 "California Streamflow Characteristics" (from records through 1968), by L.N. Jorgensen, M.A. Rose, R.D. Busch, and J.S. Bader.

1972-
1977 Pohono Gauge Records, monthly averages per water year available at Yosemite National Park.

U.S. DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE, DENVER SERVICE CENTER

1978 Draft Environmental Statement, General Management Plan, Yosemite National Park, California, Denver.

1980 *General Management Plan, Yosemite National Park, California*, Denver.

1982 *Environmental Assessment, Hydroelectrical Power System, Yosemite National Park*.

U.S. DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE, YOSEMITE NATIONAL PARK

1979 Memorandum from electrical power controller foreman on Cascade powerhouse flow release. September 19. On file at park.

1986 "Memorandum of Agreement: Yosemite National Park Hydroelectric Generating System," May 1986, by National Park Service, California State Historic Preservation Officer, and Advisory Council on Historic Preservation.

PREPARERS

Clem Diesner, Denver Service Center, Team Captain

James McConnell, Denver Service Center, Former Team Captain

John Brooks, Denver Service Center, Natural Resource Specialist

John Latschar, Denver Service Center, Section Chief

Consultants

Jon Haman, Denver Service Center, Geologist

Dennis Lee, Associate Fishery Biologist, California Department of Fish and Game

Gary Taylor, Associate Fishery Biologist, U.S. Fish and Wildlife Service

N 95/ 19391

END

10-14-91